ZooKeys 154: 1–7 (2011)
doi: 10.3897/zookeys.154.2234
www.zookeys.org

RESEARCH ARTICLE

A peer-reviewed open-access journal
ZooKeys
Launched to accelerate biodiversity research

Two new species of genus *Rhopalopsole* (Insecta, Plecoptera, Leuctridae) from China

Qian Yu-Han†, Du Yu-Zhou‡

Institute of Applied Entomology, Yangzhou University, Yangzhou, Jiangsu 225009, China

† *urn:lsid:zoobank.org:author:E9541A64-EC44-4856-B2AB-B4E8400358F8*
‡ *urn:lsid:zoobank.org:author:1FDB5781-C8A0-4088-8D18-DCD5BB01C548*

Corresponding author: *Du Yu-Zhou* (yzdu@yzu.edu.cn)

Academic editor: *C Geraci* | Received 10 November 2011 | Accepted 29 November 2011 | Published 12 December 2011

urn:lsid:zoobank.org:pub:4FF53097-6BE4-4AB3-92FE-8462E8B2F56D

Citation: Yu-Han Q, Yu-Zhou D (2011) Two new species of genus *Rhopalopsole* (Insecta, Plecoptera, Leuctridae) from China. ZooKeys 154: 1–7. doi: 10.3897/zookeys.154.2234

Abstract

Two new species of *Rhopalopsole* Klapálek from China are described: *R. exiguspina* Du & Qian, **sp. n.** and *R. ampulla* Du & Qian, **sp. n.**, which were collected in Guizhou province, China.

Keywords

Rhopalopsole, Leuctridae, Plecoptera, new species, China

Introduction

The genus *Rhopalopsole* belongs to the family Leuctridae and is distributed throughout the Oriental and Palaearctic Regions. The abdominal segments of *Rhopalopsole* species are unmodified, but the last segment bears on both lateral sides a chitinous process, the shape of which is an important character for distinguishing species. Cerci are one-segmented and slightly modified in males, and cerci shape varies according to species (Kawai 1967). The genus *Rhopalopsole* first was described by Klapálek from a Taiwanese species, *R. dentata* Klapálek (1912). Contributions to and revisions of *Rhopalopsole* were made by Okamoto (1922), Wu (1949, 1973), Illies (1966), Kawai (1967, 1968, 1969), Jewett (1958, 1975a, b), Harper (1977), Zwick (1977), Yang and Yang (1991a,

Copyright *Qian Yu-Han, Du Yu-Zhou.* This is an open access article distributed under the terms of the Creative Commons Attribution License 3.0 (CC-BY), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

b1994, 1995a, b), Yang et al. (2004) and Yang and Li (2006). Harrison and Stark (2008) provided a checklist of the genus that included 29 species, and an additional 43 species were subsequently described by Sivec et al. (2008), Stark and Sivec (2008), Yang et al. (2009), Li and Yang (2010), Li et al. (2010, 2011).

Here we describe two new *Rhopalopsole* species collected in Guizhou province, China. All type specimens were preserved in 75% ethanol and deposited in the Insect Collection of Yangzhou University, Jiangsu, China.

Taxonomy

Rhopalopsole exiguspina **Du & Qian, sp. n.**
urn:lsid:zoobank.org:act:B26AB2A6-972F-4A18-9D1D-486A980CF80F
http://species-id.net/wiki/Rhopalopsole_exiguspina
Figs 1–4

Material examined. Holotype ♂ from China, Guizhou, Yanhe County, Shaba Village, 903m, 5 Oct. 2007, Leg. Xue Hai-Yang. Paratypes 18♂♂, the same details as holotype.

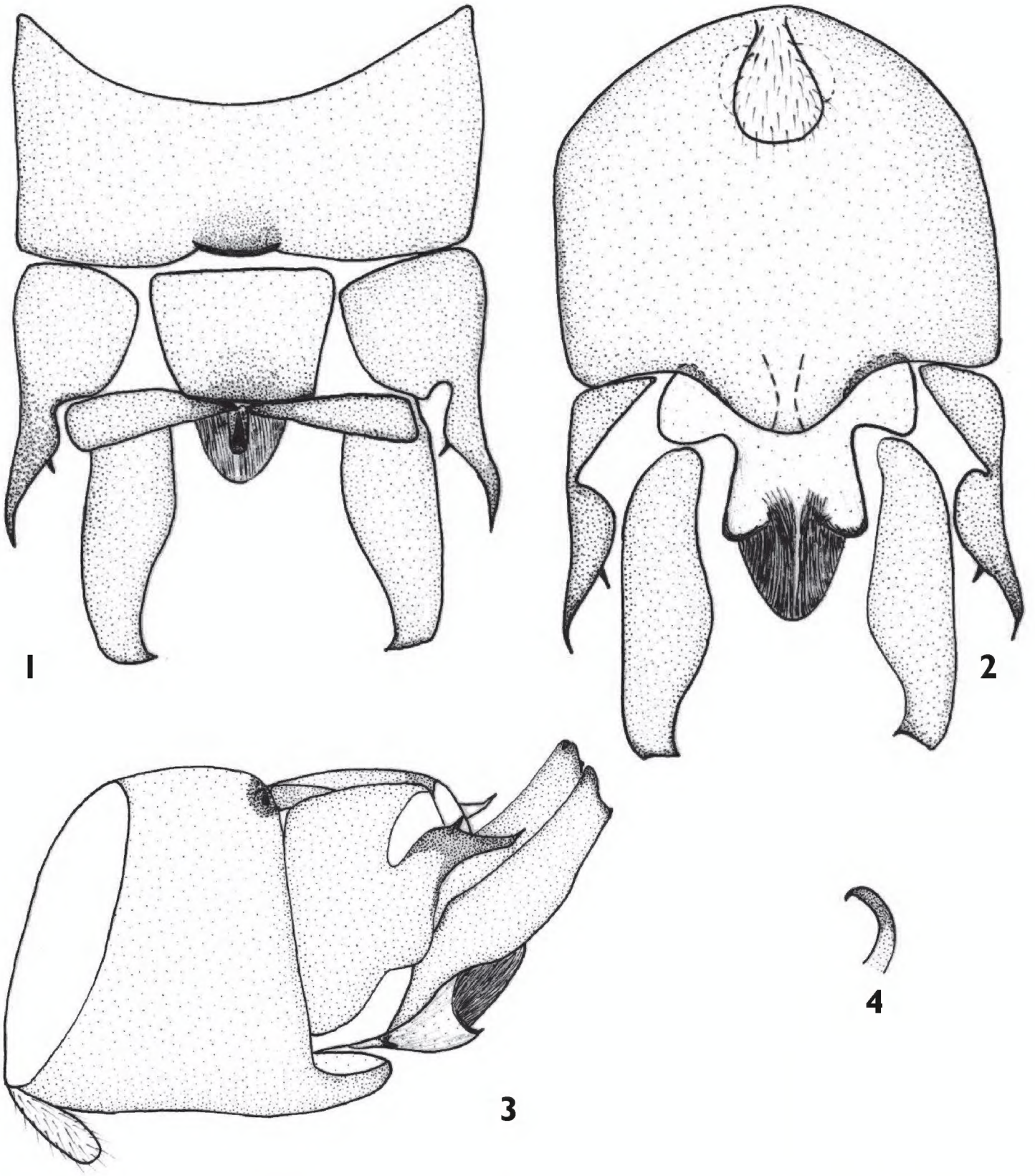
Adult habitus. General color: Light brown. Head brown or light brown, wider than prothorax, hind ocelli much closer to the eyes than to each other, antennae and palpi yellowish brown. Prothorax light brown, subquadrate, all angles somewhat rounded and some black irregular stripes on it. Legs light brown. Wings hyaline and veins light brown.

Male. Approximate measurement: forewing length 6.0 mm, body length 6.5 mm. Mid-posterior margins of tergite 9 sclerotized, slightly emarginated (Fig. 1). Sternite 9 basally with a tongue-like vesicle bears dense hairs, apically with a subgenital plate wider than long and rounded apically (Fig. 2). Tergite 10 with strongly sclerotized lateral process beak-like somewhat acute and curving inward apically and a small spine at the middle of lateral process in dorsal view, thick basally and slightly curved upward apically in lateral view. Mid-anterior sclerite sclerotized, posterior margin more sclerotized; one pair of transverse triangle sclerite weakly sclerotized (Fig. 1). Epiproct a simple curved process, erect hook-like apical portion curved inward (Fig. 4). Subanal lobe sinuate in lateral aspect, rounded and strongly sclerotized apically, apex membranous in ventral aspect; subanal lobe clearly with a pair of little lobes at middle of subanal lobe and each little lobes rounded apically in ventral aspect. Cerci long and cylindrical, thick basally and thin apically, distinctly upturned in lateral aspect, apex with a tiny spine.

Female. Unknown.

Etymology. The species name refers to the small spine at the middle of lateral process of tergite 10.

Diagnosis. This new species resembles *Rhopalopsole aculeata* Harper (1977) from Nepal and *R. xui* Yang, Zhu & Li (2004) from Guangdong in having an epiproct with a thin spine-like apical portion and a strongly sclerotized lateral process without



Figures 1–4. *Rhopalopsole exiguspina* male structures **1** Male terminal, dorsal aspect **2** Male terminal, ventral aspect **3** Male terminal, lateral aspect **4** Epiproct, lateral aspect.

bifurcation of tergite 10. The new species can be distinguished from *R. aculeata* by the presence of spines on the lateral processes and cerci. *R. aculeate* has no spines on the middle of lateral process or on the cerci. The new species can be distinguished from *R. xui* by the shapes of the mid-anterior sclerite, lateral process, subanal lobe and cerci. In *R. xui*, the mid-anterior sclerite is wider than long and has two short obtuse lateral processes. *R. xui* lacks spines at the middle of the lateral processes and on the cerci and has a wide and apically rounded subanal lobe without a pair of small lobes. The characteristics of the subanal lobe and lateral process distinguish this new species from other

Rhopalopsole species, which possess an epiproct with thin spine-like apical portions and no bifurcated lateral processes on tergite 10.

Rhopalopsole ampulla **Du & Qian, sp. n.**
urn:lsid:zoobank.org:act:B6B94919-A1E4-48D2-9CE6-6AA7A1DF63C9
http://species-id.net/wiki/Rhopalopsole_ampulla
Figs 5–7

Material examined. Holotype ♂ from China, Guizhou, Yanhe County, Shaba Village, 903m, 5 Oct. 2007, Leg. Xue Hai-Yang. Paratypes 6♂♂, the same details as holotype.

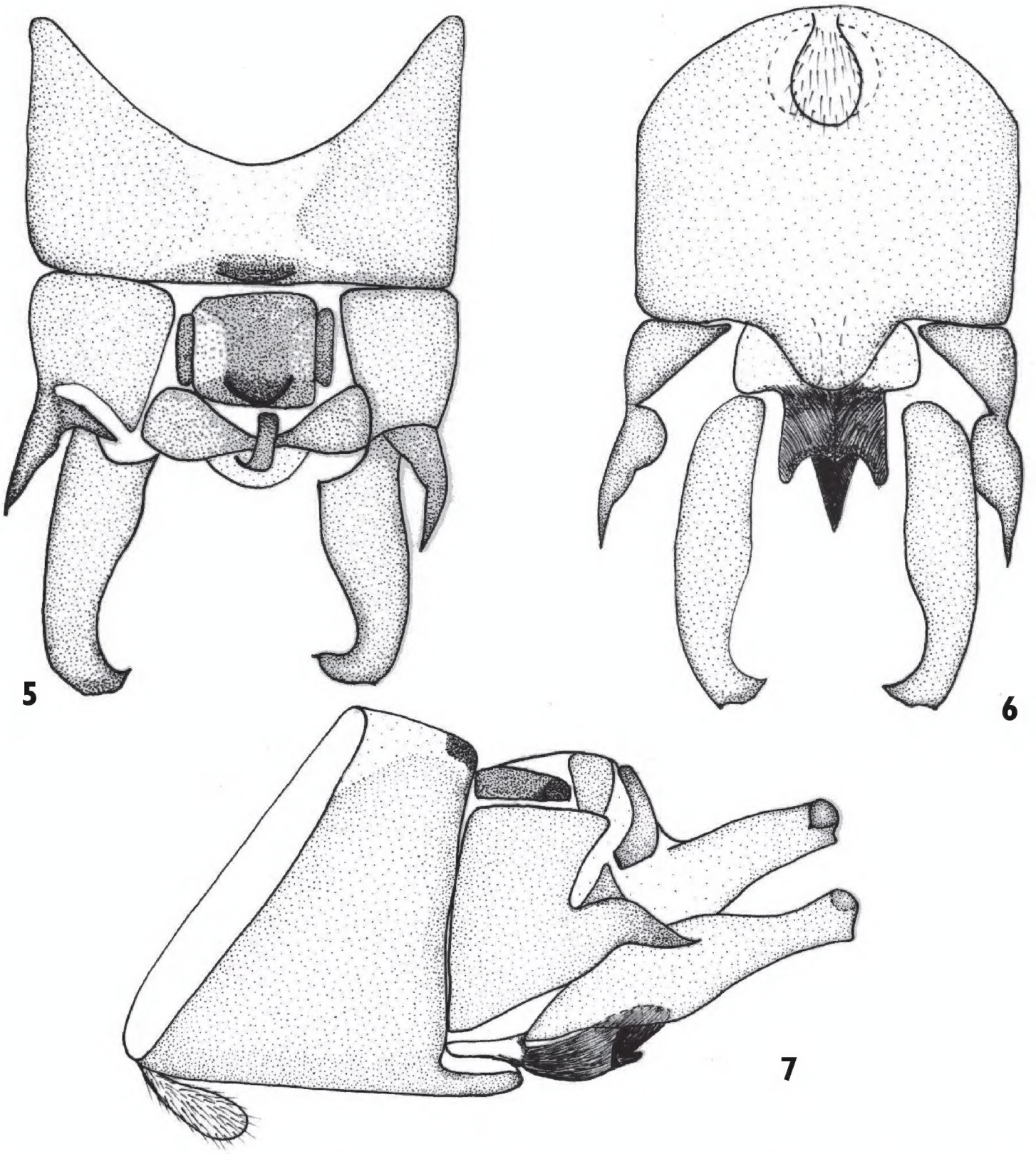
Adult habitus. General color: Brown and dark brown. Head brown or dark brown, wider than prothorax, hind ocelli much closer to the eyes than to each other, antennae and palpi brown. Prothorax dark brown, quadrate, longer than wide, all angles rounded and some black irregular stripes on it. Legs light brown. Wings hyaline and veins light brown.

Male. Approximate measurement: forewing length 8 mm, body length 8.5 mm. Tergite 9 sclerotized, with a large central membranous area, the mid-posterior margin strongly sclerotized (Fig. 5). Sternite 9 with a subgenital plate wider than long and rounded apically, basally with a tongue-like vesicle bears dense hairs (Fig. 6). Tergite 10 with two small narrow lateral mid-anterior sclerites and one large broad median mid-anterior sclerite; mid-posterior more sclerotized and protrusive; one pair of transverse sclerite weakly sclerotized (Fig. 5). Lateral processes each strongly sclerotized, spine-like rather than thick basally, narrowed apically and downward in lateral aspect (Fig. 7). Epiproct curved forward, thick and blunt apically (Fig. 5, 7). Subanal lobe strongly sclerotized at base, trident-like apically in ventral aspect and membranous at its apex (Fig. 6). Cerci long and cylindrical, ampulla-like, thick basally and thin apically, each with a tiny spine.

Female. Unknown.

Etymology. The species name refers to the shape of cerci on segment 10.

Diagnosis. This new species is similar to other species in the *Rhopalopsole assamensis* group (Sivec et al. 2008) in having a sclerotized area on the mid-posterior margin of tergite 9, thick epiproct, lateral sclerites at each side of the central sclerite and cerci with tiny spines. It can be diagnosed by the shape of the subanal lobes, which are trident-like apically. Other species in the *R. assamensis* group possess subanal lobes that are flat and narrow at the base but expand into a wide rectangular apical portion. The lateral processes of species in the *R. assamensis* group typically end in a forked process on tergite 10, but those of this new species lack bifurcation. *R. ampulla* is similar to *R. exiguspina*, but *R. ampulla* can be distinguished by the shapes of the subanal lobes and the lateral processes on tergite 10. The subanal lobes of *R. exiguspina* are rounded apically and each posses a small spine at the middle of



Figures 5–7. *Rhopalopsole ampulla* male structures **5** Male terminal, dorsal aspect **6** Male terminal, ventral aspect **7** Male terminal, lateral aspect.

lateral process, but those of *R. ampulla* are strongly sclerotized and trident-like apically in ventral aspect.

Acknowledgments

This research was supported by National Natural Science Foundation of China (No. 31071958).

References

Harper PP (1977) Capniidae, Leuctridae and Perlidae (Plecoptera) from Nepal. Oriental Insects 11: 53–62.

Harrison AB, Stark BP (2008) *Rhopalopsole alobata* (Plecoptera: Leuctridae), a new stonefly species from Vietnam. Illiesia 4: 76–80.

Illies J (1966) Katalog der rezenten Plecoptera. In: Das Tierreich, Walter de Gruyter and Company Press, Berlin, 116–119.

Jewett SG (1958) Entomological survey of the Himalaya. Part XXIII - Stoneflies (Plecoptera) from the north-west (Punjab) Himalaya. Proceedings of the National Academy Sciences (India) 28: 320–329.

Jewett SG (1975a) Records of descriptions of Stoneflies from Northwest (Punjab) Himalaya and Mt. Malaku, Nepal Himalaya. Oriental Insects 9: 1–7.

Jewett SG (1975b) Some stoneflies from Bangladesh, India and Southeast Asia. Oriental Insects 9: 127–134.

Kawai T (1967) Plecoptera (Insecta). In: Fauna Japonica, Electrical Engineering College Press, Tokyo. 42–48.

Kawai T (1968) Stoneflies from Thailand and India with descriptions of a new genus and two new species. Oriental Insects 2: 107–139.

Kawai T (1969) Stoneflies (Plecoptera) from Southeast Asia. Pacific Insects 11: 613–625.

Klapálek F (1912) Plecoptera I. In: Sauter's Formosa-Ausbeute H (Ed) Entomologische Mitteilungen l, 342–351.

Li W-H, Kong F-B, Yang D (2011) A New Species of *Rhopalopsole shaanxiensis* species group (Plecoptera, Leuctridae) from China. Acta Zootaxonomica Sinica 36: 246–248.

Li W-H, Li G-L, Yang D (2010) A New Species of the Genus *Rhopalopsole* (Plecoptera: Leuctridae) from Sichuan, China. Acta Zootaxonomica Sinica 35: 310–312.

Li W-H, Yang D (2010) Two new species of *Rhopalopsole vietnamica* group (Plecoptera: Leuctridae: Rhopalopsole) from China. Zootaxa 2614: 59–64.

Okamoto H (1922) Zweiter Beitrag zar Kenntnis der Japanischen Plecopteren. Bulletin of the Agricultural Experiment Station, Government-General of Chosen, Korea 1: 1–46.

Sivec I, Harper P P, Shimizu T (2008) Contribution to the study of the oriental genus *Rhopalopsole* (Plecoptera: Leuctridae). Scopolia 64: 1–122.

Stark BP, Sicec I (2008) *Rhopalopsole mataikan* (Plecoptera: Leuctridae), a new stonefly species from Brunei Darussalam. Illiesia 4: 139–142.

Wu CF (1949) Third-sixth supplements to the stoneflies of China (Order Plecoptera). Peking Natural Histrory Bulletin 17: 251–256.

Wu CF (1973) New species of Chinese Stoneflies (Order Plecoptera). Acta Entomology Sinica 16: 97–118.

Yang D, Li W-H, Zhu F (2004) Two new species of *Rhopalopsole* (Plecoptera: Leuctridae) from China. Entomological News 115: 279–282.

Yang D, Li W-H, Zhu F (2006) A new species of *Rhopalopsole* (Plecoptera: Leuctridae) from China. Entomological News 117: 433–435. doi: 10.3157/0013-872X(2006)117[433:ANSORP]2.0.CO;2

Yang D, Shi L, Li W-H (2009) A new species of *Rhopalopsole* from oriental China (Plecoptera: Leuctridae). Transactions of the American Entomological Society 135: 193–195. doi: 10.3157/061.135.0207

Yang D, Yang C-K (1991a) New species of Plecoptera from Hubei. Journal of Hubei University 13: 369–372.

Yang D, Yang C-K (1991b) One new species of *Rhopalopsole* from Zhejiang. Journal of Zhejiang Forestry College 8: 78–79.

Yang D, Yang C-K (1994) Two new species of *Rhopalopsole* (Plecoptera: Leuctridae) from Shaanxi. Entomotaxonomia 16: 189–191.

Yang D, Yang C-K (1995a) Plecoptera: Leuctridae. In: Insects and Macrofungi of Gutianshan, Zhejiang, Zhejiang Science and Technology Press, Hangzhou, 20–24.

Yang D, Yang C-K (1995b) Plecoptera: Leuctridae. In: Insects of Baishanzu Mountain, Eastern China, China Forestry Publishing House Press, Beijing, 61–62.

Zwick P (1977) Ergebnisse der Bhutan - Expedition 1972 des Naturhistorischen Museums in Basel. Plecoptera. Entomologica Basiliensia 2: 85–134.